

Inguinal Hernia

National Digestive Diseases Information Clearinghouse



What is an inguinal hernia?

An inguinal hernia happens when contents of the abdomen—usually fat or part of the small intestine—bulge through a weak area in the lower abdominal wall. The abdomen is the area between the chest and the hips. The area of the lower abdominal wall is also called the inguinal or groin region.

Two types of inguinal hernias are

- indirect inguinal hernias, which are caused by a defect in the abdominal wall that is congenital, or present at birth
- direct inguinal hernias, which usually occur only in male adults and are caused by a weakness in the muscles of the abdominal wall that develops over time

Inguinal hernias occur at the inguinal canal in the groin region.

What is the inguinal canal?

The inguinal canal is a passage through the lower abdominal wall. People have two inguinal canals—one on each side of the lower abdomen. In males, the spermatic cords pass through the inguinal canals and connect to the testicles in the scrotum—the sac around the testicles. The spermatic cords contain blood vessels, nerves, and a duct, called the spermatic duct, that carries sperm from the testicles to the penis. In females, the round ligaments, which support the uterus, pass through the inguinal canals.

What causes inguinal hernias?

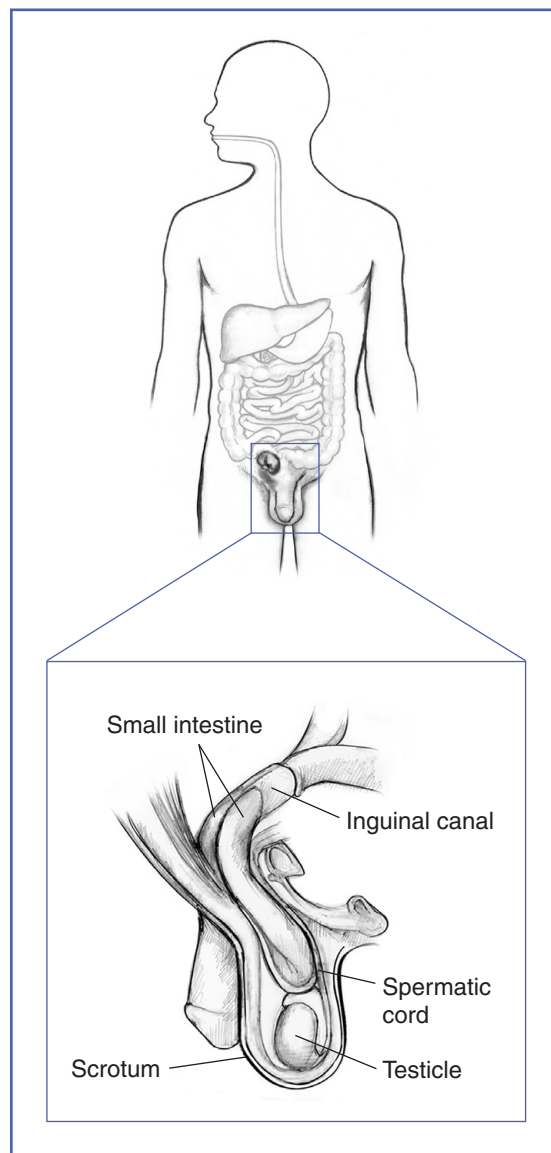
The cause of inguinal hernias depends on the type of inguinal hernia.

Indirect inguinal hernias. A defect in the abdominal wall that is present at birth causes an indirect inguinal hernia.

During the development of the fetus in the womb, the lining of the abdominal cavity forms and extends into the inguinal canal. In males, the spermatic cord and testicles descend out from inside the abdomen and through the abdominal lining to the scrotum through the inguinal canal. Next, the abdominal lining usually closes off the entrance to the inguinal canal a few weeks before or after birth. In females, the ovaries do not descend out from inside the abdomen, and the abdominal lining usually closes a couple of months before birth.¹

Sometimes the lining of the abdomen does not close as it should, leaving an opening in the abdominal wall at the upper part of the inguinal canal. Fat or part of the small intestine may slide into the inguinal canal through this opening, causing a hernia. In females, the ovaries may also slide into the inguinal canal and cause a hernia.

Indirect hernias are the most common type of inguinal hernia.² Indirect inguinal hernias may appear in 2 to 3 percent of male children; however, they are much less common in female children, occurring in less than 1 percent.³



Indirect inguinal hernia in a male

Direct inguinal hernias. Direct inguinal hernias usually occur only in male adults as aging and stress or strain weaken the abdominal muscles around the inguinal canal. Previous surgery in the lower abdomen can also weaken the abdominal muscles.

Females rarely form this type of inguinal hernia. In females, the broad ligament of the uterus acts as an additional barrier behind the muscle layer of the lower abdominal wall. The broad ligament of the uterus is a sheet of tissue that supports the uterus and other reproductive organs.

Who is more likely to develop an inguinal hernia?

Males are much more likely to develop inguinal hernias than females. About 25 percent of males and about 2 percent of females will develop an inguinal hernia in their lifetimes.² Some people who have an inguinal hernia on one side will have or will develop a hernia on the other side.

People of any age can develop inguinal hernias. Indirect hernias can appear before age 1 and often appear before age 30; however, they may appear later in life. Premature infants have a higher chance of developing an indirect inguinal hernia. Direct hernias, which usually only occur in male adults, are much more common in men older than age 40 because the muscles of the abdominal wall weaken with age.⁴

People with a family history of inguinal hernias are more likely to develop inguinal hernias. Studies also suggest that people who smoke have an increased risk of inguinal hernias.⁵

What are the signs and symptoms of an inguinal hernia?

The first sign of an inguinal hernia is a small bulge on one or, rarely, on both sides of the groin—the area just above the groin crease between the lower abdomen and the thigh. The bulge may increase in size over time and usually disappears when lying down.

Other signs and symptoms can include

- discomfort or pain in the groin—especially when straining, lifting, coughing, or exercising—that improves when resting
- feelings such as weakness, heaviness, burning, or aching in the groin
- a swollen or an enlarged scrotum in men or boys

Indirect and direct inguinal hernias may slide in and out of the abdomen into the inguinal canal. A health care provider can often move them back into the abdomen with gentle massage.

What are the complications of inguinal hernias?

Inguinal hernias can cause the following complications:

- **Incarceration.** An incarcerated hernia happens when part of the fat or small intestine from inside the abdomen becomes stuck in the groin or scrotum and cannot go back into the abdomen. A health care provider is unable to massage the hernia back into the abdomen.

- **Strangulation.** When an incarcerated hernia is not treated, the blood supply to the small intestine may become obstructed, causing “strangulation” of the small intestine. This lack of blood supply is an emergency situation and can cause the section of the intestine to die.

Seek Immediate Care

People who have symptoms of an incarcerated or a strangulated hernia should seek emergency medical help immediately. A strangulated hernia is a life-threatening condition. Symptoms of an incarcerated or a strangulated hernia include

- extreme tenderness or painful redness in the area of the bulge in the groin
- sudden pain that worsens quickly and does not go away
- the inability to have a bowel movement and pass gas
- nausea and vomiting
- fever

How are inguinal hernias diagnosed?

A health care provider diagnoses an inguinal hernia with

- a medical and family history
- a physical exam
- imaging tests, including x rays

Medical and family history. Taking a medical and family history may help a health care provider diagnose an inguinal hernia. Often the symptoms that the patient describes will be signs of an inguinal hernia.

Physical exam. A physical exam may help diagnose an inguinal hernia. During a physical exam, a health care provider usually examines the patient's body. The health care provider may ask the patient to stand and cough or strain so the health care provider can feel for a bulge caused by the hernia as it moves into the groin or scrotum. The health care provider may gently try to massage the hernia back into its proper position in the abdomen.

Imaging tests. A health care provider does not usually use imaging tests, including x rays, to diagnose an inguinal hernia unless he or she

- is trying to diagnose a strangulation or an incarceration
- cannot feel the inguinal hernia during a physical exam, especially in patients who are overweight
- is uncertain if the hernia or another condition is causing the swelling in the groin or other symptoms

Specially trained technicians perform imaging tests at a health care provider's office, an outpatient center, or a hospital.

A radiologist—a doctor who specializes in medical imaging—interprets the images. A patient does not usually need anesthesia.

Tests may include the following:

- **Abdominal x ray.** An x ray is a picture recorded on film or on a computer using a small amount of radiation. The patient will lie on a table or stand during the x ray. The technician positions the x-ray machine over the abdominal area. The patient will hold his or her breath as the technician takes the picture so that the picture will not be blurry. The technician may ask the patient to change position for additional pictures.
- **Computerized tomography (CT) scan.** CT scans use a combination of x rays and computer technology to create images. For a CT scan, the technician may give the patient a solution to drink and an injection of a special dye, called contrast medium. A health care provider injects the contrast medium into a vein, and the injection will make the patient feel warm all over for a minute or two. The contrast medium allows the health care provider to see the blood vessels and blood flow on the x rays. CT scans require the patient to lie on a table that slides into a tunnel-shaped device where the technician takes the x rays. A health care provider may give children a sedative to help them fall asleep for the test.
- **Abdominal ultrasound.** Ultrasound uses a device, called a transducer, that bounces safe, painless sound waves off organs to create an image of their structure.

How are inguinal hernias treated?

Repair of an inguinal hernia via surgery is the only treatment for inguinal hernias and can prevent incarceration and strangulation. Health care providers recommend surgery for most people with inguinal hernias and especially for people with hernias that cause symptoms. Research suggests that men with hernias that cause few or no symptoms may be able to safely delay surgery until their symptoms increase.^{3,6} Men who delay surgery should watch for symptoms and see a health care provider regularly. Health care providers usually recommend surgery for infants and children to prevent incarceration.¹ Emergent, or immediate, surgery is necessary for incarcerated or strangulated hernias.

A general surgeon—a doctor who specializes in abdominal surgery—performs hernia surgery at a hospital or surgery center, usually on an outpatient basis. Recovery time varies depending on the size of the hernia, the technique used, and the age and health of the person.

Hernia surgery is also called herniorrhaphy. The two main types of surgery for hernias are

- **Open hernia repair.** During an open hernia repair, a health care provider usually gives a patient local anesthesia in the abdomen with sedation; however, some patients may have
 - sedation with a spinal block, in which a health care provider injects anesthetics around the nerves in the spine, making the body numb from the waist down
 - general anesthesia

The surgeon makes an incision in the groin, moves the hernia back into the abdomen, and reinforces the abdominal wall with stitches. Usually the surgeon also reinforces the weak area with a synthetic mesh or “screen” to provide additional support.

- **Laparoscopic hernia repair.** A surgeon performs laparoscopic hernia repair with the patient under general anesthesia. The surgeon makes several small, half-inch incisions in the lower abdomen and inserts a laparoscope—a thin tube with a tiny video camera attached. The camera sends a magnified image from inside the body to a video monitor, giving the surgeon a close-up view of the hernia and surrounding tissue. While watching the monitor, the surgeon repairs the hernia using synthetic mesh or “screen.”

People who undergo laparoscopic hernia repair generally experience a shorter recovery time than those who have an open hernia repair. However, the surgeon may determine that laparoscopy is not the best option if the hernia is large or if the person has had previous pelvic surgery.

Most adults experience discomfort and require pain medication after either an open hernia repair or a laparoscopic hernia repair. Intense activity and heavy lifting are restricted for several weeks. The surgeon will discuss when a person may safely return to work. Infants and children also experience some discomfort; however, they usually resume normal activities after several days.

Surgery to repair an inguinal hernia is quite safe, and complications are uncommon. People should contact their health care provider if any of the following symptoms appear:

- redness around or drainage from the incision
- fever
- bleeding from the incision
- pain that is not relieved by medication or pain that suddenly worsens

Possible long-term complications include

- long-lasting pain in the groin
- recurrence of the hernia, requiring a second surgery
- damage to nerves near the hernia

How can inguinal hernias be prevented?

People cannot prevent the weakness in the abdominal wall that causes indirect inguinal hernias. However, people may be able to prevent direct inguinal hernias by maintaining a healthy weight and not smoking.

People can keep inguinal hernias from getting worse or keep inguinal hernias from recurring after surgery by

- avoiding heavy lifting
- using the legs, not the back, when lifting objects
- preventing constipation and straining during bowel movements
- maintaining a healthy weight
- not smoking

Eating, Diet, and Nutrition

Researchers have not found that eating, diet, and nutrition play a role in causing inguinal hernias. A person with an inguinal hernia may be able to prevent symptoms by eating high-fiber foods. Fresh fruits, vegetables, and whole grains are high in fiber and may help prevent the constipation and straining that cause some of the painful symptoms of a hernia.

The surgeon will provide instructions on eating, diet, and nutrition after inguinal hernia surgery. Most people drink liquids and eat a light diet the day of the operation and then resume their usual diet the next day.

Points to Remember

- An inguinal hernia happens when contents of the abdomen—usually fat or part of the small intestine—bulge through a weak area in the lower abdominal wall.
- A defect in the abdominal wall that is present at birth causes an indirect inguinal hernia.
- Direct inguinal hernias usually occur only in male adults as aging and stress or strain weaken the abdominal muscles around the inguinal canal. Females rarely form this type of inguinal hernia.
- The first sign of an inguinal hernia is a small bulge on one or, rarely, on both sides of the groin—the area just above the groin crease between the lower abdomen and the thigh.

- An incarcerated hernia happens when part of the fat or small intestine from inside the abdomen becomes stuck in the groin or scrotum and cannot go back into the abdomen.
- When an incarcerated hernia is not treated, the blood supply to the small intestine may become obstructed, causing “strangulation” of the small intestine.
- People who have symptoms of an incarcerated or a strangulated hernia should seek emergency medical help immediately. A strangulated hernia is a life-threatening condition.
- Repair of an inguinal hernia via surgery is the only treatment for inguinal hernias and can prevent incarceration and strangulation.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases’ (NIDDK’s) Division of Digestive Diseases and Nutrition supports basic and clinical research into digestive and abdominal conditions.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at www.nih.gov/health/clinicaltrials. For information about current studies, visit www.ClinicalTrials.gov.

References

1. Aiken JJ, Oldham KT. Chapter 38: Inguinal hernias. In: Kleigman RM, Stanton BF, St. Geme JW, Schor NF, Behrman RE, eds. *Nelson Textbook of Pediatrics*. 19th ed. Philadelphia: Elsevier Saunders; 2011: 1362–1368.
2. Nicks BA. Hernias. Medscape website. <http://emedicine.medscape.com/article/775630-overview#aw2aab6b2b3>. Updated April 21, 2014. Accessed April 23, 2014.
3. Kelly KB, Ponsky TA. Pediatric abdominal wall defects. *Surgical Clinics of North America*. 2013;93(5):1255–1267.
4. Quintas ML, Rodrigues CJ, Yoo JH, Rodrigues Junior AJ. Age related changes in the elastic fiber system of the interfoveolar ligament. *Revista do Hospital das Clínicas*. 2000;55(3):83–86.
5. Simons MP, Aufenacker T, Bay-Nielsen M, et al. European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia*. 2009;13(4):343–403.
6. Jeyarajah R, Harford WV. Chapter 24: Abdominal hernias and gastric volvulus. In: Feldman M, Friedman LS, Brandt LJ, eds. *Sleisenger and Fordtran’s Gastrointestinal and Liver Disease: Pathophysiology, Diagnosis, Management*. 9th ed. Philadelphia: Elsevier Saunders; 2010: 379–395.

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